

Utah Department of Transportation



**Supplemental Specifications
for**

**2004 Standard
Specifications**

**FOR ROAD AND BRIDGE
CONSTRUCTION**

U.S. Standard Units (Inch-Pound Units)

Issued September 8, 2004

Memorandum

UTAH DEPARTMENT OF TRANSPORTATION

DATE: September 8, 2004

TO: Holders of Hard Copy of Standard Specifications

FROM: Barry Axelrod, CDT
Standards and Specifications

SUBJECT: Supplemental Specifications Distribution, dated September 8, 2004

Applicable files for the change are attached. Maintain these files as a supplemental update to the UDOT Standard Specifications dated March 15, 2004. No pages are to be removed or replaced in the basic book, electronic or hard copy.

If you are in need of electronic copies of any Standard or Supplemental Specification please refer to the Standards and Specifications Web site at <http://www.udot.utah.gov/index.php?m=c&tid=302>. From there select the **2004 Standards** subtopic.

If you have any questions or problems with the electronic files contact me at 801-964-4570 or by email at baxelrod@utah.gov.

Attachments

Listing of Supplemental Specifications

Issue Date: May 27, 2004

Revised April 29, 2004

- Section 01554M Article 3.2 A1b (deleted)
- Section 01721 Entire section revised to correct oversight. Article 3.5 H (added).
Replaces Standard Specification. (See September 8, 2004 Issue for replacement.)
- Section 02822M Article 2.4 B (revised)
- Section 13551 Entire section revised. Replaces Standard Specification.
- Section 13552 Entire section revised. Replaces Standard Specification.
- Section 13553 Entire section revised. Replaces Standard Specification.
- Section 13554 Entire section revised. Replaces Standard Specification.
- Section 13555 Entire section revised. Replaces Standard Specification.
- Section 13556 Entire section revised. Replaces Standard Specification.
- Section 13557 Entire section revised. Replaces Standard Specification.
- Section 13561 New section added.
- Section 13591 Entire section revised. Replaces Standard Specification.
- Section 13592 Entire section revised. Replaces Standard Specification.
- Section 13593 Entire section revised. Replaces Standard Specification.
- Section 13594 Entire section revised. Replaces Standard Specification.
- Section 13595 New section added.

Issue Date: July 13, 2004

Revised June 24, 2004

- Section 02751 New section added.
- Section 02961M Articles 1.2, 2.1, and 3.1 (revised)
- Section 02963M Articles 1.2 and 2.1 (revised)
- Section 02968 Section deleted
- Section 02981 New section added.

Issue Date: September 8, 2004

Revised August 26, 2004

- Section 01455M Article 1.5 and 1.6 (revised)
- Section 01721 Entire section reissued with addition of Article 3.3C. Replaces
Supplemental issued May 27, 2004.
- Section 02753 Entire section revised. Replaces Standard Specification.
- Section 02754 New section added.
- Section 02771M Articles 2.5 and 3.6 added. Article 3.3E deleted.

**Supplemental Specification
2004 Standard Specification Book**

SECTION 01455M

MATERIALS QUALITY REQUIREMENTS

Delete Articles 1.5 and 1.6 and replace with the following:

1.5 LOCAL OPTIONAL MATERIAL SOURCES - CONTRACTOR FURNISHED SOURCES

- A. Obtain Environmental Clearances in accordance with Section 01355.
- B. Acquire the rights to take materials from sources other than those designated in the Contract.
- C. Locate, where practicable, borrow, gravel, and quarry materials sites where they are not visible from the highway.
- D. Pay all related costs including those for haul length and for exploring and developing sources.
- E. Notify the Engineer in writing of the choice and location of aggregate source.
- F. Perform required quality tests using a UDOT qualified laboratory. Submit copies of test reports to Engineer.
 - 1. The Engineer may require additional samples for inspection and testing before authorizing use of the source.
- G. The Department does not allow any extension of the original contract time to accommodate testing of non-designated sources.
- H. For non-commercial pits, prepare materials site plans that show in detail the line and grades to which materials are to be removed.
 - 1. Obtain Engineer's evaluation of the materials site plans as to their physical, environmental, and ecological effect before removing any materials.
- I. Strip and stockpile topsoil.

1.6 FINISHING LOCAL OPTIONAL MATERIAL SOURCE SITES

- A. Finish all (public or private) material source sites to leave a pleasing appearance.
- B. Grade to drain without causing excessive erosion and without altering the natural drainage courses.
- C. Locate waste sites in areas that are least visible from public view. Spread waste material to obtain a natural appearance.
- D. Remove trash. Remove, bury or distribute excess materials over the disturbed areas when excavation has been completed.
- E. Perform required grading and reclamation, as required under the agreement with the property owner, when work to remove materials is completed and before spreading topsoil.
 - 1. Avoid vertical cuts and sharp corners.
 - 2. Grade side slopes to achieve a natural appearance.
 - 3. Abandon and obliterate haul roads.
- F. Spread topsoil over the excavated area and seed all areas disturbed by construction operations, including obliterated haul roads, with a grass or grasses adaptable to the area and approved by the Engineer and property owner. Perform seeding under the contract requirements for Seeding, including mulching.
- G. Finishing local material source sites, including seeding and mulching, is not measured or paid for separately and is considered incidental to other items of work.
- H. Prior to final project acceptance, provide the Engineer with a written release from the property owner indicating that all conditions of the agreement are satisfied.

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SECTION 01721

SURVEY

Delete Section 01721 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Schedule, coordinate, and provide all construction surveying, staking, measurement and calculations (including measurement and calculation of quantities for contract pay items measured or paid for by area or volume) essential to complete the project and properly control the entire work.
- B. Directed surveying as requested by the Engineer.

1.2 RELATED SECTIONS

- A. Section 02765: Pavement Marking Paint

1.3 MEASUREMENT PROCEDURES

- A. Directed Survey: If extra survey work is needed, a 2-Person Crew measured by the hour authorized. Department makes no additional payment for travel time to and from the project.
- B. Directed Survey: If extra survey work is needed a 3-Person Crew measured by the hour authorized. Department makes no additional payment for travel time to and from the project.

1.4 PAYMENT PROCEDURES

- A. If contract does not include separate pay item for survey, include the costs in all items of work that require survey. Failure to comply with any portion of this specification may result in withholding up to 25 percent of contract payments until the deficiencies are corrected.

- B. If needed and approved, directed survey work paid for in the accepted quantities at the following rates:

2 person survey crew	\$130.00 per hour
3 person survey crew	\$155.00 per hour
1 person computation and /or CAD	\$ 65.00 per hour

- C. The number of hours required for computations and/or drafting in total cannot exceed 33 percent of actual survey hours, established on a percent basis prior to directed survey work starts.

1.5 SUBMITTALS

- A. The Department requires that a Professional Engineer or Professional Land Surveyor registered in the State of Utah sign and seal all submittals.
- B. Resubmittals may be required depending on completeness and correctness of the work.
- C. Prior to beginning work, submit a statement indicating all Department-provided horizontal and vertical control have been field checked and the control has been determined to be accurate within the tolerances specified in this section. Attach field survey information used to verify control. If discrepancies are found, notify the Engineer verbally and in writing.
- D. Prior to beginning work, provide a written description of the equipment (including calibration certifications), manpower, methods, and data storage format proposed for use to complete all survey activities.
- E. Record keeping: Keep all field notes, diaries, and books according to standard surveying practice.
1. Loose leaf books not acceptable.
 2. Make available at any time all survey records including field notebooks and forms used for the work to the Engineer upon verbal or written request.
- F. Submit electronic files, plots and calculations of appropriate contract pay item quantities to the Engineer for review and approval, a minimum of 3 working days prior to the pre-determined estimate cut-off date.
- G. After project completion, return to the Engineer all surveying and design data and provide a red-lined hard copy plan set showing as-constructed features denoting changes from the original design.

1.6 QUALITY ASSURANCE

- A. Contractor is responsible for survey and control of the work, and for correcting Contractor errors, whether the errors are discovered during the actual survey work or in subsequent phases of the project. Bear any cost overruns resulting from Contractor errors.
- B. Perform all work in accordance with the plans and specifications and standard Engineering and Surveying practices under the responsible charge of a Professional Engineer or Professional Land Surveyor duly and properly registered in Utah.
- C. The Engineer may spot check the work for accuracy and may reject unacceptable portions of work. Resurvey rejected work and correct work that is not within the specified tolerances at no additional expense to the Department.

PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Furnish tools, supplies, and stakes suitable for use in highway survey work.
- B. Furnish stakes and hubs of sufficient length to provide a solid set in the ground with sufficient surface area above ground for necessary legible markings.
- C. Furnish survey instruments and supporting equipment capable of achieving the specified tolerances. Calibrate survey equipment for accuracy prior to beginning survey work and as required.

PART 3 EXECUTION

3.1 PREPARATION

- A. Discuss and coordinate the following with the Engineer before survey work begins:
 - 1. Required submittals
 - 2. Survey and staking methods
 - 3. Stake markings
 - 4. Grade control
 - 5. Referencing

6. Structure control
 7. Any other procedures and control necessary for the work
 8. Documentation procedures
- B. Establish construction survey points, elevations and grades as necessary to control layout and complete the work. Verify all control surveying and staking meets specified tolerances for prior to beginning work.
- C. Calculate all grades, elevations, offsets and alignment data necessary for staking and/or setting items of work. Obtain approval from the Engineer for alternate methods of establishing grade control with wire lines, computer or laser controlled grading or other suitable methods.
- D. Provide appropriate traffic control for all survey activities.
- E. The Department furnishes:
1. Plans showing locations of control points
 2. Plans showing locations of Bench Marks
 3. Cross sections developed during design, if any
 4. Electronic project data, if any
 5. Digital Terrain Model used for design, if any

CONTRACT PROVISION DISCLAIMER

RELEASE OF UDOT DATA: Contractor may obtain an electronic copy of the Data Points prepared by UDOT. UDOT provides data points in Microstation and/or Inroads format only. Contractor responsible for translation into other formats. This data does not include the commercial software needed to read the points. In order to obtain an electronic copy, Contractor makes a written request to the Engineer. Contractor agrees and understands that the data points are prepared by UDOT for its own purposes and not for the benefit of private individuals or businesses. Contractor waives any and all claims that may result from the use of or reliance upon the data points. Contractor indemnifies UDOT and holds it harmless for any damages, costs, attorneys' fees, or other liabilities that might be incurred as a result of the Department's use and reliance on the data.

3.2 DIRECTED SURVEY

- A. Conduct directed surveying if requested by the Engineer.
1. Includes work needed for changes and extra work. Provide all labor, materials, and equipment including global positioning satellite equipment.
 2. Obtain prior written authorization from the Engineer documenting the affected work and requirements before performing work under these items.

3.3 COMPUTATIONS AND PLOTS

- A. Use cross-sections to calculate volume measurements.
 - 1. Superimpose final cross sections with original cross sections and calculate final quantities using the average end area method.
 - 2. Develop cross-sections from field measurements.
 - a. Take cross section measurements both before and after excavation and prior to backfill.
 - b. When the centerline curve radius is less than or equal to 500 ft, take cross sections at a maximum centerline spacing of 25 ft.
 - c. When the centerline curve radius is greater than 500 ft, take cross sections at a maximum spacing of 50 ft.
 - d. Take additional cross sections at breaks in terrain and at changes in typical sections.
 - e. For each cross section, measure and record points at breaks in terrain, but at least every 25 ft unless otherwise approved by the Engineer.
 - f. Measure and record points to at least the anticipated slopes and reference locations.
 - g. Reduce all cross section distances to horizontal distances from centerline.
 - h. Take cross sections at right angles to tangents and normal to curves.
 - i. Include in cross sections all grades, locations, and existing ground line profiles.
 - 3. May develop cross sections from digital terrain models provided that:
 - a. The ground survey locations do not exceed 100 ft in any direction
 - b. Major breaks in terrain are also included.
 - c. The horizontal and vertical control for the project is used
 - d. The DTM is verified accurate to require tolerances by spot checking throughout the length of the project.
- B. Engineer may approve alternate methods of calculating quantities.
- C. When requesting additional compensation on the basis of adjustment to quantities in the bid proposal for items paid as “plan quantity,” provide all computations, plots, and supporting documentation necessary for the Engineer to evaluate and verify adjusted quantities.
 - 1. All work associated with providing computations, plots, and supporting documentation is at no cost to the Department, except:
 - a. When the Engineer revises plan dimensions. Refer to Section 01280.

- b. When the adjusted quantity differs from the plan quantity by more than 10%, work required to provide computations, plots, and supporting documentation will be paid for as extra work.

3.4 STAKE MAINTENANCE AND MARKING

- A. Maintain ALL staking necessary for the work until the construction has been completed and accepted by the Engineer.
 - 1. Legibly mark all survey stakes with station and offset referenced to their respective control line.
 - 2. Mark slope, reference and guard stakes with station.
 - 3. Renew illegible stakes at no additional cost to the Department.
- B. Provide and maintain reference stakes that identify stationing at least every 100 ft until all work has been completed and accepted by the Engineer.

3.5 CONTROL POINT AND SURVEY TOLERANCES

- A. Relocate initial horizontal and vertical control points in conflict with construction to areas that will not be disturbed by construction operations. Furnish the coordinates and elevations for the relocated points before the initial points are disturbed.
- B. Protect bench marks from construction activities. Position all bench marks to allow a level rod to stand vertically and squarely on the mark. Reference bench marks to centerline and horizontal measurements.

C. Survey and establish control within the following tolerances:

Description	Horizontal	Vertical
	Decimals of a foot	
Control points	± 0.01	± 0.01
Centerline points	± 0.03	± 0.02
Cross sections and slope stakes	± 0.10	± 0.10
Slope stake references	± 0.10	± 0.10
Culverts and Ditches	± 0.10	± 0.05
Minor drainage structures	± 0.10	± 0.03
Curb and gutter	± 0.02	± 0.02
Guardrail and concrete barrier	± 0.05	± 0.05
Retaining walls	± 0.05	± 0.01
Bridge substructure and overall	± 0.01	± 0.01
Bridge superstructure and overall	± 0.01	± 0.01
Environmental Control Limits	± 1.00	-----
Clearing and grubbing limits	± 1.00	-----
Right of Way Limits	± 0.02	-----
Roadway subgrade finish stakes	± 0.10	meet tolerance of succeeding layer
Roadway finish grade stakes	± 0.04	meet tolerance of succeeding layer
Signals and electrical	± 0.05	± 0.02
Striping	± 0.08	-----
Paving reference line	± 0.04	± 0.01

Coordinate the survey tolerances of any items not listed above with the Engineer.
Tolerances given above are subordinate to any tolerances listed in other specifications.

D. Staking limits:

1. Stake clearing limits on both sides of centerline at each established station. Locate the clearing limit on the ground as shown by the cut and fill limits on the plans.
2. Stake right of way limits every 50 ft maximum on tangents, every 25 ft maximum on curves and at all right of way breaks. If staking distance is affected by line of sight, reduce the distance.

3. Stake environmental control limits on both sides of centerline at each established station. Locate the environmental control limits on the ground as shown by the slope rounding contours and environmental and silt fence locations as shown on the Plans. Stake environmental control limits every 50 ft and every 25 ft where environmental or silt fence is required.
- E. Furnish reference stakes for all slope stakes and stakes used for setting items for work.
1. Maintain the reference stakes for the duration of the project until the Engineer approves removal.
 2. Establish and set slope stakes and references on both sides of centerline at cross section locations.
 - a. When the centerline curve radius is less than or equal to 500 ft, place slope stakes at a maximum centerline spacing of 25 ft.
 - b. When the centerline curve radius is greater than 500 ft, place slope stakes at a maximum spacing of 50 ft.
 3. Establish slope stakes in the field as the actual point of intersection of the design slope with the natural ground line.
 4. Set slope stake references outside the clearing limits.
 5. Include all reference point and slope stake information on the reference stakes.
- F. After the slope staking is completed, record on the cross section guard stakes the vertical distance from the reference point (RP) to the construction grade, at a minimum horizontal distance of 10 ft outside the clearing limits or at right of way.
- G. Setting grade finishing stakes:
1. For grade elevations and horizontal alignment:
 - a. On centerline.
 - b. On each shoulder at roadway cross section locations and between centerline and shoulder with a maximum spacing of 15 ft.
 - c. At the top of subgrade and the top of each aggregate course.
 2. Locations:
 - a. Where turnouts are constructed, set stakes on centerline, on each normal shoulder, and on the shoulder of the turnout.
 - b. In parking areas, set hubs at the center and along the edges of the parking area.
 - c. Set stakes in all ditches to be paved.
 3. Maximum spacing between stakes along the alignment: 50 ft.
 4. Use brushes or guard stakes at each grade finishing stake.
 5. Reset grade finishing stakes as many times as necessary to construct the subgrade and each aggregate course.

- H. The following Advanced Traffic Management System (ATMS) As-Built requirements apply to all ATMS device installations, that include but are not limited to Ramp Meters, Closed Circuit Television (CCTV), Variable Message Sign (VMS), Roadway Weather Information System - Environmental Sensor Station (RWIS-ESS), Weigh In Motion (WIM), and Fiber Optic Communication Systems.

1. Department:
 - a. Provide project design files to Contractor in MicroStation format.
2. Contractor:
 - a. Carefully document all changes and updates all files to accurately represent the system as-built conditions.
 - b. Plot three sets of the updated files on 11-inch x 17-inch bond paper and submit the plots to the Engineer for review and approval.
3. As-built drawings will not be considered complete until the Engineer has given formal approval of the plots and design files.
4. Include the following in as-built drawings:
 - a. Site plans with distances.
 - b. Final cabinet configuration, including wiring schematic.
 - c. Pin-outs for any custom connectors.
 - d. Laminated copy of the detector layout for the site, consisting of site map and including detector numbering, locations, and input file designation.
 - e. GPS coordinates for all junction boxes, conduit runs (250 foot intervals), and ATMS devices. Include latitude, longitude, and elevation in WGS 84 format to nine decimal place precision (XXX.XXXXXXX) in coordinates.

3.6 CONCRETE PAVING

- A. Develop a method of horizontal and vertical control for the placement of concrete pavement.
1. Utilize laser, wire, or string line, for example, to maintain horizontal and vertical control.
 2. Maximum spacing: 50 ft.
 3. Set control on both sides of roadway.
- B. Stake concrete joint and station stamp locations.

3.7 DRAINAGE STRUCTURES

- A. Stake drainage structures to fit field conditions and in coordination with the Engineer. The location of the structures may differ from the plans.
 - 1. Survey and record the ground profile along the centerline of the structure.
 - 2. Determine the slope catch points at inlets and outlets.
 - 3. Set reference points and record information necessary to determine structure length and end treatments.
 - 4. Stake ditches or grade to make the structure functional.
 - 5. Plot the profile along centerline of the structure to show the natural ground, the flow line, the roadway section, and the structure.
 - 6. Mark guard stakes with the following, when applicable:
 - a. Diameter, length and type of culvert (for example 18 inch x 35 ft corrugated metal pipe (cmp))
 - b. The vertical and horizontal distance from the hub to the invert at the end of the culvert or any intermediate point as needed or directed
 - c. Flow line grade of the pipe
 - d. Station
 - 7. For storm sewers and waterlines provide a reference at a maximum spacing of 50 ft. Reference inverts of pipe at all manholes.

3.8 BRIDGES

- A. Set a minimum of 3 horizontal and vertical control reference points to be used for surveying all bridge substructure and superstructure components, including but not limited to; pile locations and cutoffs, line and grade for abutments and bents, beam seats, anchor bolts and screed grades.
- B. Set intermediate slope stakes at bridge abutments to establish transitions. Place finish grade stakes on the centerline of abutment bearing and at the top of slope of all bridge berms. Place finish grade stakes on each side at top, mid-point or slope and toe of fill.

3.9 BOX CULVERTS

- A. Set horizontal and vertical control and reference points. Establish and reference the centerline, back of parapet, skew, and flow line elevations at inlet, outlet and breaks.

3.10 CURB AND GUTTER

- A. Set curb and gutter staking at 25 ft intervals on tangent and 10 ft intervals on curve radii. Set line and grade for curb and gutter within 0.02 ft. of the proposed or established grade line.

3.11 GUARDRAIL

- A. Stake guardrail vertical and horizontal control at a maximum spacing of 25 ft on tangent sections and 10 ft on curved sections unless otherwise approved.

3.12 EXISTING SURVEY MONUMENTS

- A. Under the direction of a surveyor licensed in the State of Utah, locate and reference all private and public land survey monuments that may be destroyed by project construction activities prior to disturbing those existing monuments.
- B. Complete referencing and reestablishing those existing monuments at no cost to the Department and before project completion.
- C. In some counties the county surveyor references and reestablishes the monuments.
 - 1. Notify the county surveyor at least 30 days prior to the destruction of any monument.
 - 2. Coordinate the reestablishment of section corner and quarter corner monuments with the county surveyor.
 - 3. Submit drawings and notes showing references to section corners and quarter corners to the Engineer.
- D. If a monument is found during construction but is not shown on the contract plans and must be reset, the Department pays for the additional work under the Directed Survey item.

3.13 RETAINING WALLS

- A. Set horizontal and vertical control and reference points. Establish and reference the centerline offsets for the walls, radius points, and the beginning and ending wall locations as shown on the plans.
- B. Stake retaining wall vertical and horizontal control at a maximum spacing of 25 ft on tangent sections and 10 ft on curved sections unless otherwise approved.

3.14 PAVEMENT MARKING

- A. Layout all temporary and permanent pavement markings per Section 02765.

3.15 CLEANUP

- A. Remove and dispose of all flagging, lath, stakes and other staking material after the project is complete.
 - 1. Place references for traffic striping a minimum of 150 feet apart on tangents and a minimum of 50 feet on curves.

3.16 UTILITIES

- A. As part of cooperating with the utility companies, stake control lines as needed so their facilities can be relocated to their proper final position. Also, stake crossings or potential points of conflict between facilities to give proper horizontal and vertical control for the relocation. Schedule this survey work with the utility companies to minimize delays and disruption of survey stakes. Replace all disturbed stakes as necessary to facilitate the relocations. The Contractor is responsible for costs incurred to relocate any utility more than once due to inaccurate or incomplete staking.

END OF SECTION

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SECTION 02753

**FULL DEPTH SLAB REPLACEMENT FOR
CONCRETE PAVEMENTS**

Delete Section 02753 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Remove full panel or partial panel of existing pavement.
- B. Clean, grade and reconsolidate base.
- C. Install dowels and/or tie bars.
- D. Replace and cure repair material.

1.2 RELATED SECTIONS

- A. Section 02752: Portland Cement Concrete Pavement.
- B. Section 03055: Portland Cement Concrete.
- C. Section 03390: Concrete Curing

PART 2 PRODUCTS

2.1 FULL DEPTH CONCRETE PAVEMENT REPAIR MATERIAL

- A. Follow Section 02752, except;
 - 1. It is acceptable to use high range water reducers, (Super Plasticizers).
 - 2. May accelerate the rate of concrete strength gain to match the field placement schedule with written permission from the Engineer.

PART 3 EXECUTION

3.1 PREPARATION

- A. Remove panel, panels, or panel section.
 - 1. Determine the extent/dimensions of the repair from the plan sheets, or as directed by the Engineer. Adhere to the requirements of PV series Standard Drawings.
 - 2. Complete removal, make full depth cuts around the perimeter of the rectangular section to be removed. Minimize saw overcuts.
 - 3. Remove panels by lift-out method. Use chains and lift pins to facilitate removal and minimize disturbance of the base material.
 - 4. Repair damage caused by removal operations to adjacent slabs and underlying base courses.
 - 5. Remove all loose particles of old Portland Cement Concrete (PCC), prior to placing new PCC.
- B. Reconstruct base to grade, and compact to standard specifications.
- C. Form any side that does not have an adjacent panel. Form to match existing panels, providing a vertical edge.
- D. Place dowel and/or tie bars.
 - 1. Place bars in locations as per PV series Standard Drawings. Use tie-bars or smooth dowels where indicated on standard drawings.
 - 2. Stockpile bars in an area where they are kept clean and free from damage.
 - 3. Drill holes mid-depth of the slab without causing damage to the remaining pavement section and orient holes such that bar placement tolerances can be met.
 - 4. Drill multiple holes simultaneously with drills held horizontally in a rigid frame. Prevent drill bits from wandering.
 - 5. Clean holes of dust, grease and other contaminants.
 - 6. Inject Type II epoxy resin adhesive into the back of the drilled hole.
 - a. Use material on the UDOT Performance Data Products Listing.
 - b. Provide sufficient quantity of bonding compound to completely fill the void between the bar and the outer limits of the drilled hole.
 - c. While inserting bar, rotate one full revolution.
 - d. Use retention rings to prevent the bonding compound from flowing out of the hole.
 - 7. Align bars horizontally and vertically to meet requirements of the standard drawings and allow them to stabilize prior to mix placement.
 - 8. Repair any bar coating damage with appropriate repair material.

9. Place tight fitting end caps made of non-metallic materials that allow ¼ inch movement, on protruding dowels used at expansion joints. Submit a sample of the end caps to the Engineer for approval prior to use on the project.
 10. Coat protruding portion of dowel bar with lubricant consisting of paraffin wax, lithium grease or other semi-solid, inert lubricant approved by the Engineer.
 11. Remove and replace loose bars, at the Contractor's expense, prior to placing concrete mix.
- E. Prepare existing joints for placement.
1. Maintain existing pavement joint layout.
 2. Place a bond breaker approved by the Engineer, on the existing pavement edges that compose existing joints, either transverse or horizontal.
 3. Saw joint on the same line if repairs straddle an existing joint line. Perform sawing in accordance with Section 03390.

3.2 PLACING CONCRETE

- A. Place concrete in compliance with Section 02752.
- B. Consolidate the mix in compliance with Section 02752.
- C. Weather Limitations – Section 03055.

3.3 CONCRETE FINISHING

- A. Finish patch to +/- 1/8 inch of existing profile.
 1. Correct patch profiles in excess of 1/8 inch higher than the existing pavement profile through surface grinding or removal and replacement.
 2. Correct patch profiles in excess of 1/8 inch lower than the existing pavement profile through removal and replacement of the patch.
 3. Pay for any corrections to the finish of the patch.
- B. Do not tool joints that are to be saw-cut and sealed.
- C. Texture the surface to match the existing pavement.

3.4 CONCRETE CURING AND PROTECTION

- A. Cure the concrete pavement according to Section 03390.
- B. Do not open to traffic until 4000 psi strength is reached.

- C. Cut all previously existing joints to original dimensions.
- D. Fill all sawing overcuts with approved Repair Epoxy on the UDOT Performance Data Products Listing (PDPL).
- E. Replacement slab must perform under traffic at specified time of opening without failure.
- F. Pay for removing and replacing any defective panels. Refer to Section 02752.
- G. Protect the individual placements with approved barricades.

3.5 LIMITATIONS

- A. Refer to Section 03055.

END OF SECTION

**Supplemental Specification
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SECTION 02754

DOWEL BAR RETROFIT

Add Section 02754:

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedures and materials for installing coated dowel bars across existing transverse joints and cracks.

1.2 RELATED SECTIONS

- A. Section 03211: Reinforcing Steel and Welded Wire.

1.3 REFERENCES

- A. AASHTO M 148: Liquid Membrane-Forming Compounds for Curing Concrete.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Dowel Bars: 1 1/2 inch x 18 inch, smooth steel rod, following Section 03211.
- B. Bond Breaking Compound: Use a bond-breaking compound approved by the Engineer.
- C. Chair Devices: Coat according to Section 03211, or make of non-metallic materials, the devices used to support and hold the dowel bar in place. Provide a minimum clearance of 1/2 inch between the bottom of the bar and the surface upon which the chair is placed.

- D. End Caps: Place on dowels, tight fitting end caps made of non-metallic materials that allows for 1/4-inch movement of the bar at each end. Submit a sample of the end caps to the Engineer for approval prior to use on the project.
- E. Caulking Filler: Use a standard commercial silicone sealer specified for use with concrete surfaces. Submit a sample of the caulking filler to the Engineer for approval prior to use on the project.
- F. Patching Material: Select from the UDOT Performance Data Products Listing (PDPL) - Portland Cement Concrete Repair Materials - Horizontal, or an approved equal, to replace the concrete pavement that was removed to install the dowel bars. Use mix with 1/4 inch nominal maximum aggregate size. Submit a sample of the material to the Engineer for approval prior to use on the project.
- G. Joint/Crack Preservation Material: Use a rigid removable material capable of maintaining the joint or crack.

2.2 EQUIPMENT

- A. Jackhammers: To prevent spalling, use jackhammer less than the nominal 30 pound class.

PART 3 EXECUTION

3.1 CONSTRUCTION

- A. Saw cut the pavement as required per PV Series Standard Drawings.
- B. Jackhammer and sand blast to clean all exposed surfaces and cracks, removing slurry and loose concrete.
- C. All residues from the saw, jackhammer and sand blasting process become property and responsibility of the contractor.
- D. Fill the contraction joint as per PV Series Standard Drawings.
- E. Pre-coat the dowel bars with a bond-breaking compound.

- F. Place the foam core board at the middle of the dowel bar to maintain the transverse joint or crack. Fit the foam core board tightly around the dowel bar and to the bottom and edges of the slot. Maintain the foam core board in a vertical position and tight to all edges during placement of the patching material as per PV Series Standard Drawings.
- G. Repair or replace at no cost to the Department any dowel bars damaged.
- H. Thoroughly moisten all surfaces of the slot immediately prior to filling with patching material. Prevent standing water in the slot. Remove all excess water with compressed air.
- I. Fill the slot with an approved patching material. Consolidate the material in the slot and around the dowel bar with an appropriate size vibrator. Finish patching materials to existing surfaces. Place and cure the patching material according to manufacturer's specifications. Cure using ASHTO M 148, Type 1-D, Class A.
- J. Replace any individual dowel bar retrofit not functioning or damaged at no cost to the Department.
- K. Remove joint preservation material to a depth of two inches and reseal.

END OF SECTION

**Supplemental Specification
2004 Standard Specification Book**

SECTION 02771M

**CURBS, GUTTERS, DRIVEWAYS, PEDESTRIAN ACCESS
RAMPS, AND PLOWABLE END SECTIONS**

Add the following to Section 02771, Part 2:

2.5 DETECTABLE WARNING SURFACE

- A. Detectable Warning Surface – In-line truncated dome pattern that meets the requirements of GW series Standard Drawings. Provide a color that contrasts visually with the adjoining surfaces (either light-on-dark, or dark-on-light). Acceptable products for installation are as follows:
 - 1. Polymer Composite Panel – Polymer Composite, homogenous integral color (UV stable), skid resistant, non-glare finished panel. Use for new construction or retrofit construction.
 - 2. Precast Concrete Panel – High strength concrete with high tensile stainless steel tendons, homogeneous integral color (UV stable), skid resistant panel. Use for new construction, or retrofit construction.

Delete Article 3.3, Paragraph E.

Add the following to Part 3:

3.6 DETECTABLE WARNING SURFACE

- A. Polymer Composite Panel Installation:
 - 1. Install cast-in-place detectable warning panel directly into the finished plastic concrete surface in accordance with manufacturer recommendations. Provide a smooth transition between the panel and the surrounding concrete surface.
 - 2. Install surface applied detectable warning panel directly on existing concrete surface in accordance with manufacturers recommendations and installation procedures. Use mechanical fasteners to secure the panel to the existing surface. Caulk a smooth transition bead along beveled panel edge and surrounding concrete surface.

B. Precast Concrete Panel Installation:

1. Place as shown on drawings. Install per manufacturer recommendations for cast-in-place or thin set method. Provide a smooth transition between the panel and the surrounding concrete surface.